



## Application of Wind Atlas for South Africa

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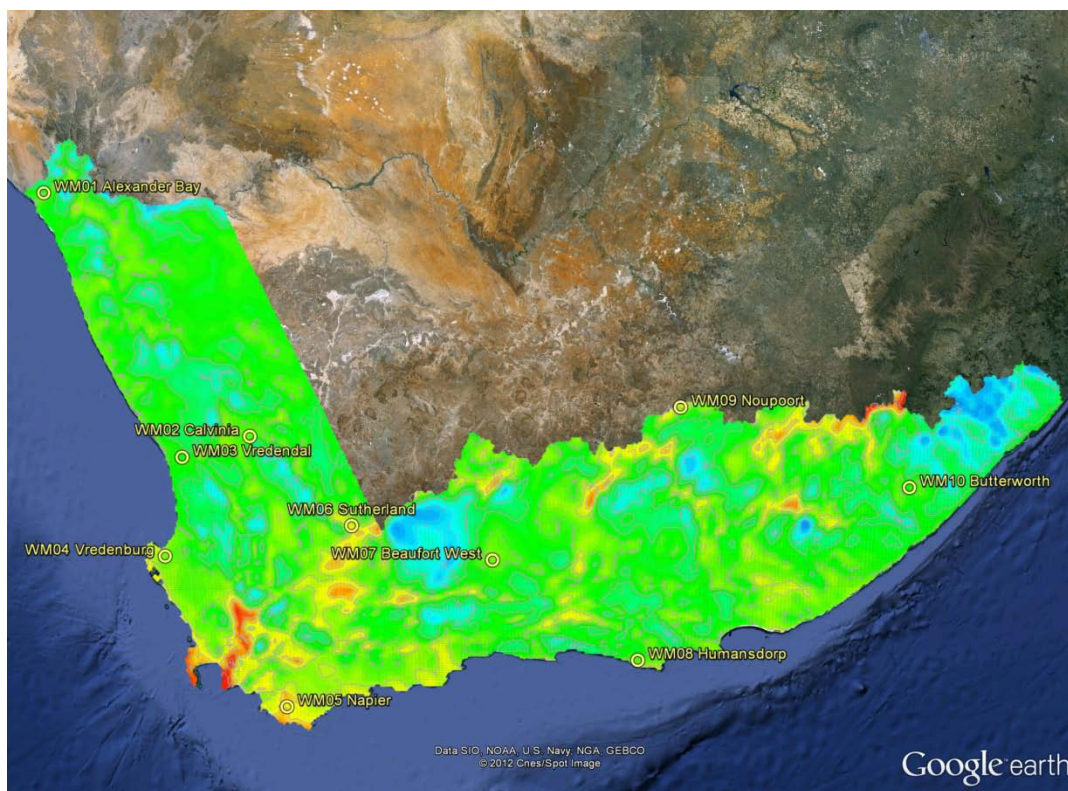
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# Application of Wind Atlas for South Africa

Niels G Mortensen and the WASA team



# Outline

## Application of Wind Atlas for South Africa

- How to use the Wind Atlas for South Africa?
  - WASA web sites, Tadpole, WASP data, guidelines
  - Wind farm case studies and examples
  - Resource mapping in sample areas
  - Phase II microscale modelling
- Q&A
- Questionnaire introduction and feedback (*Eugene, CSIR*)
- Take a look at the information available!

## Software clinic

- Attendees are invited to use the “First Verified Numerical Wind Atlas for South Africa”

## WASA project web sites

- General information about WASA project
  - [www.wasaproject.info](http://www.wasaproject.info)
  - [www.saneri.org.za/wind\\_atlas.htm](http://www.saneri.org.za/wind_atlas.htm)
- WRF wind forecasts are available on
  - [veaonline.risoe.dk/wasa](http://veaonline.risoe.dk/wasa)
- CSIR online – display of measured data
  - [www.wasa.csir.co.za](http://www.wasa.csir.co.za)
- WASA met. data download site (monthly files)
  - [wasadata.csir.co.za/wasa1/WASADData](http://wasadata.csir.co.za/wasa1/WASADData)
- WASA wind atlas download site **NEW!**
  - [wasadata.csir.co.za/wasa1/WASADData](http://wasadata.csir.co.za/wasa1/WASADData)

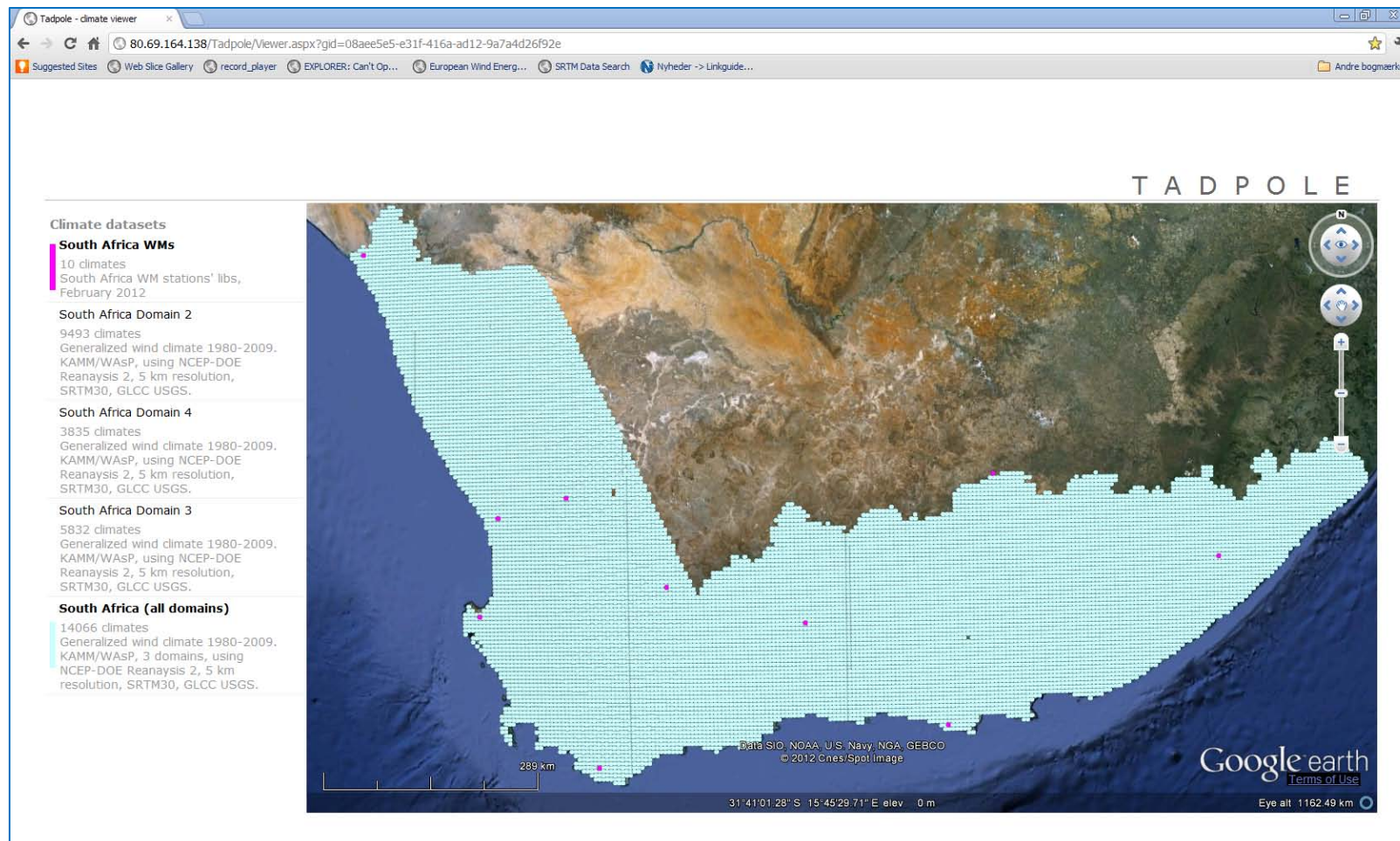
## WASA Wind Atlas download site

- First Numerical Wind Atlas – Tadpole
  - The Tadpole web interface uses the Google Earth plug-in
  - Google Chrome 1.0+, Internet Explorer 7+ (32-bit) and Firefox 2.0+
- Observational Wind Atlas
  - WAsP data and workspaces
- Case studies
  - Wind farm and wind resource mapping examples
- Reports and guidelines
  - WASA reports and general WAsP guidelines
- Map data and tools
  - SRTM 3 elevation data, SWBD water body data, Google Earth
- Software
  - Using WAsP as a data viewer (reader) and for microscale modelling



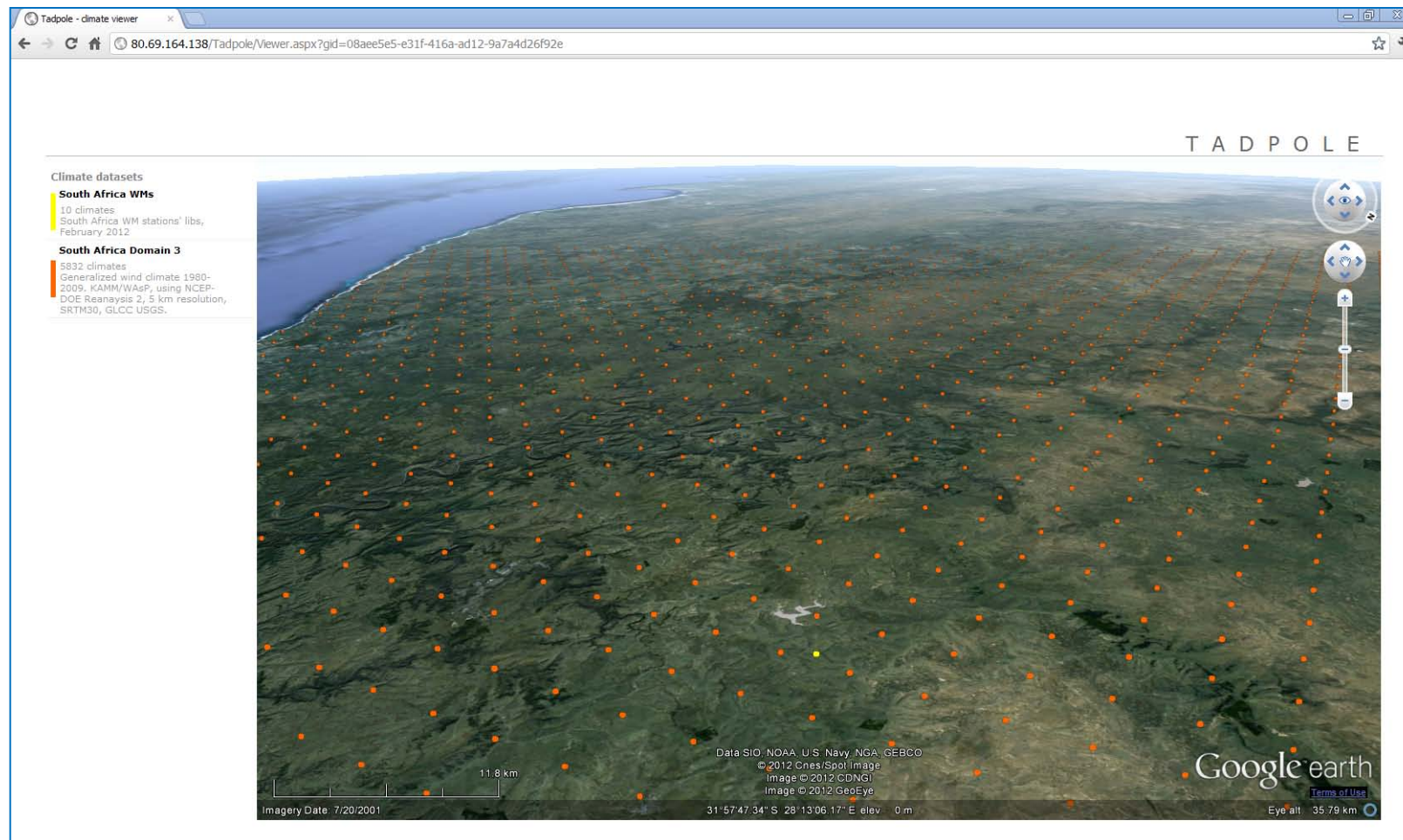
# Numerical wind atlas

## Tadpole: interface to wind atlas results



# Numerical wind atlas

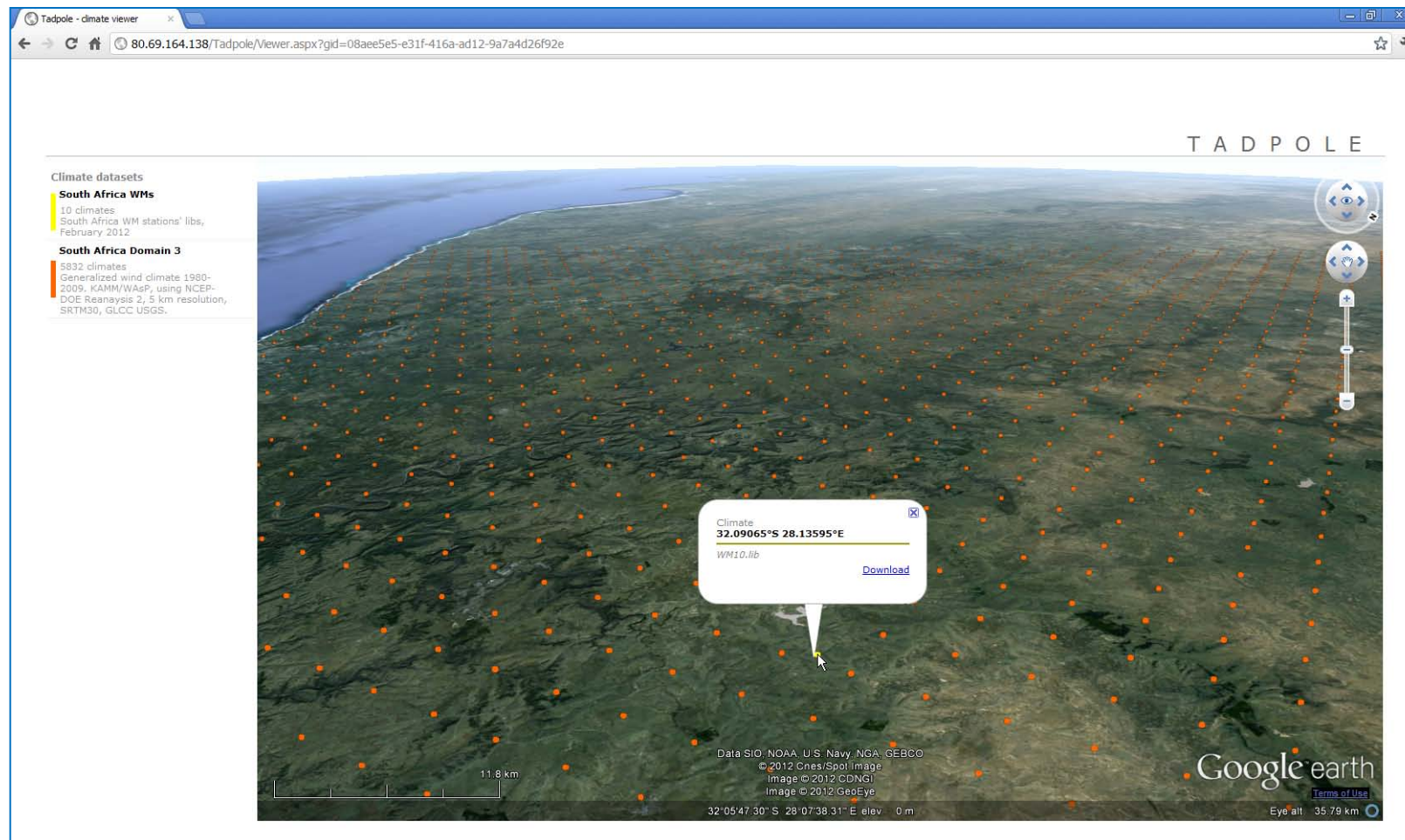
## Tadpole: WM10 (●) and mesoscale grid points (●)





# Numerical wind atlas

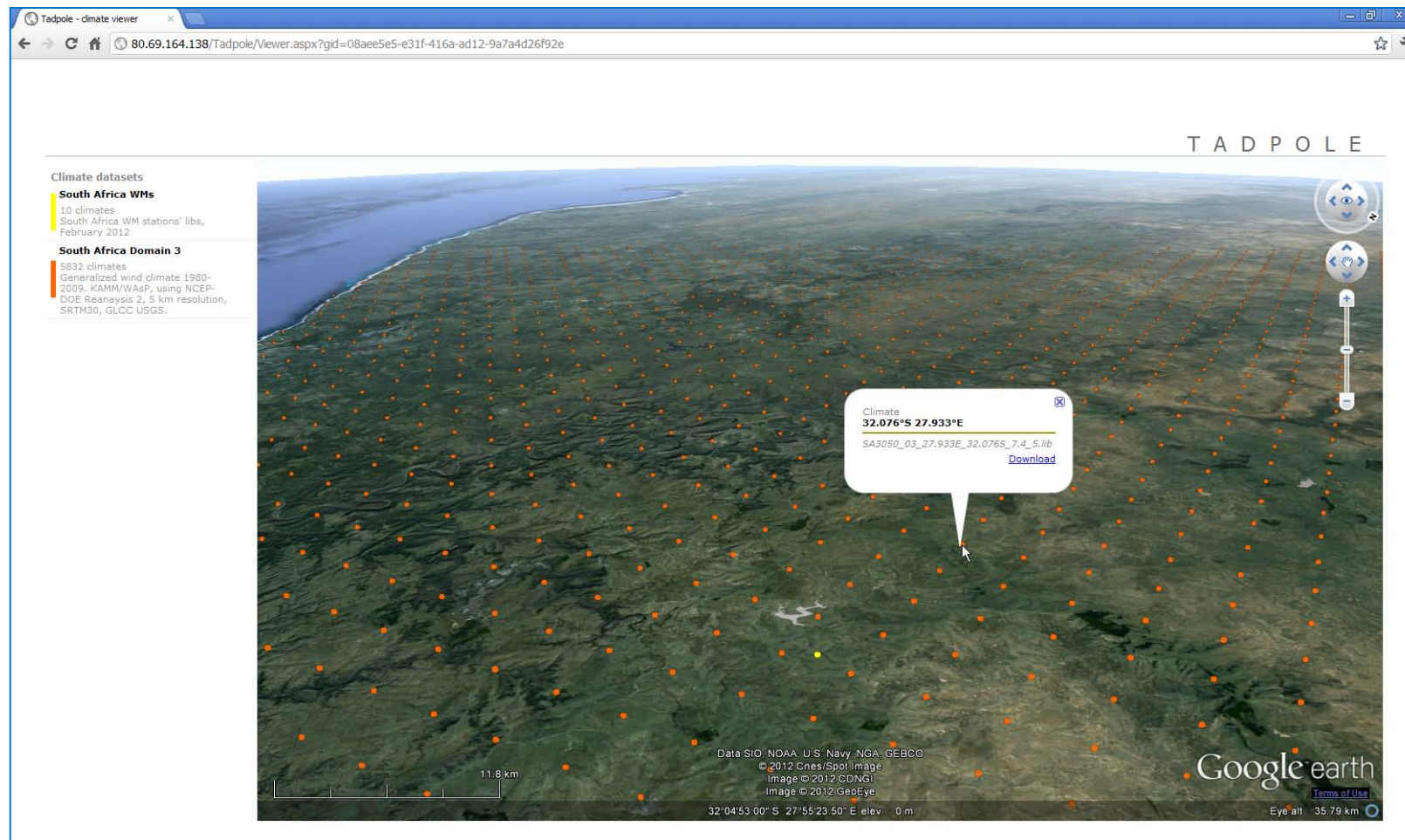
## Tadpole: download of data from WM10 (just click!)





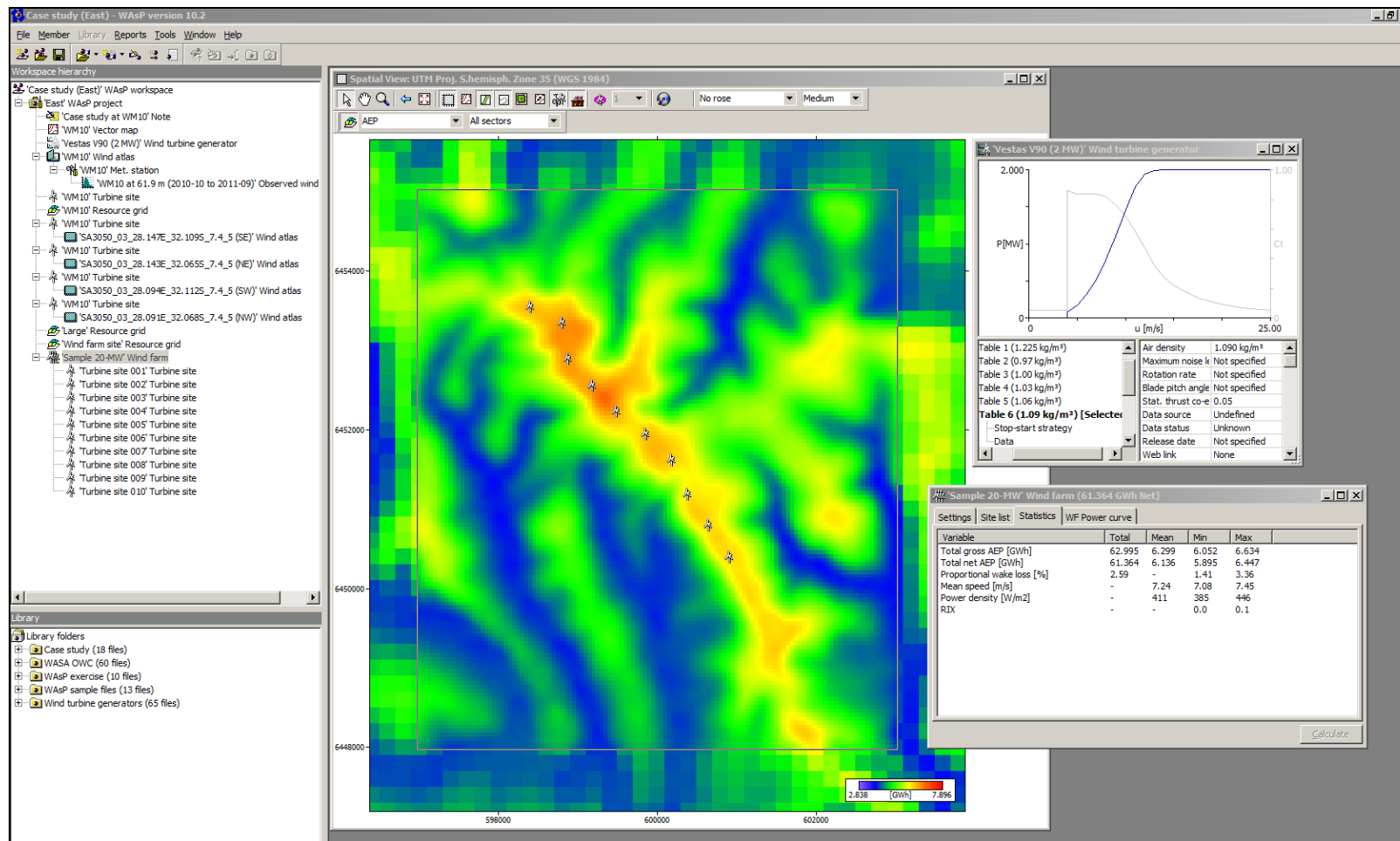
# Numerical wind atlas

## Tadpole: download of data from NWA grid point



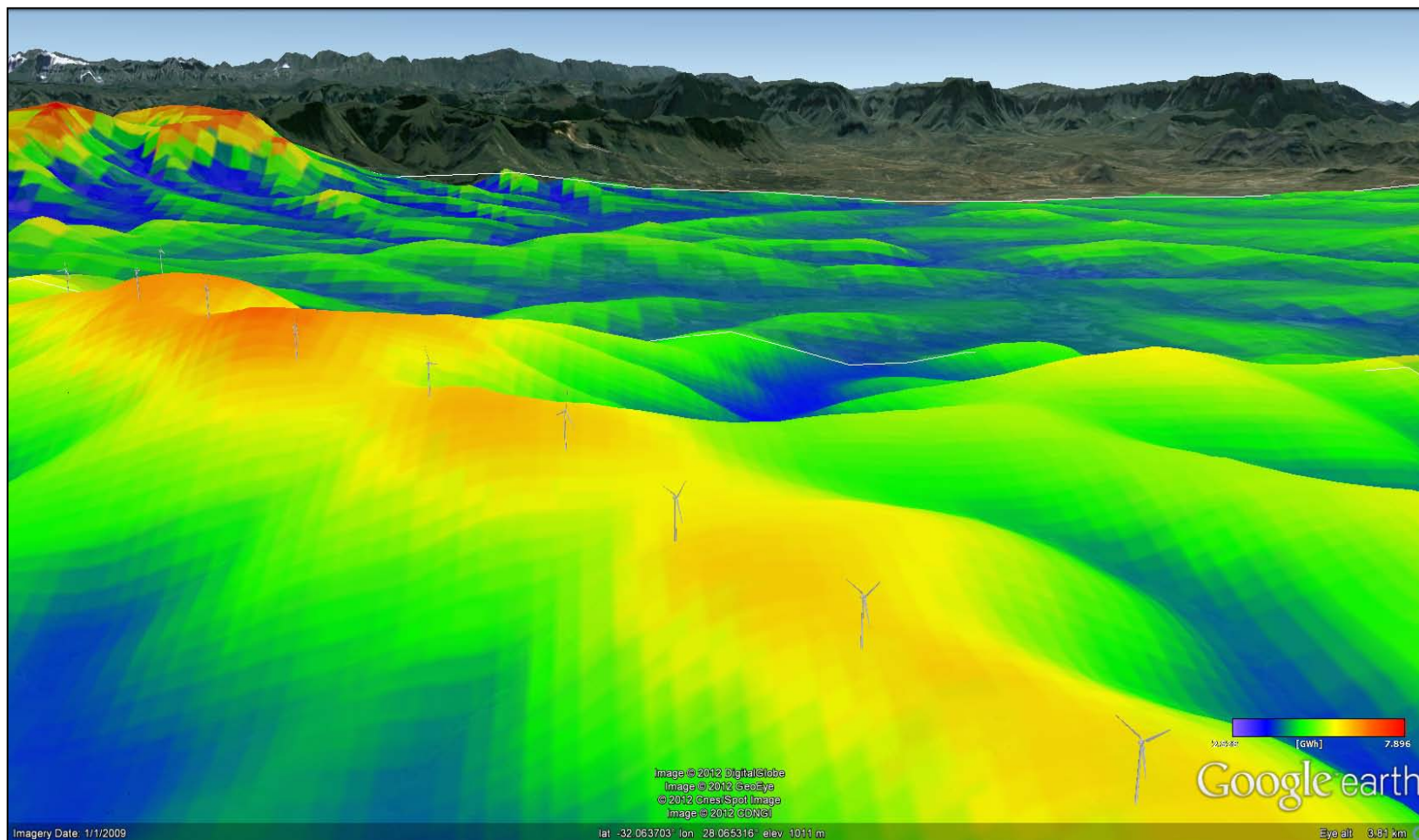
# Case study 1

## Sample wind farm project in WAsP



## Case study 1

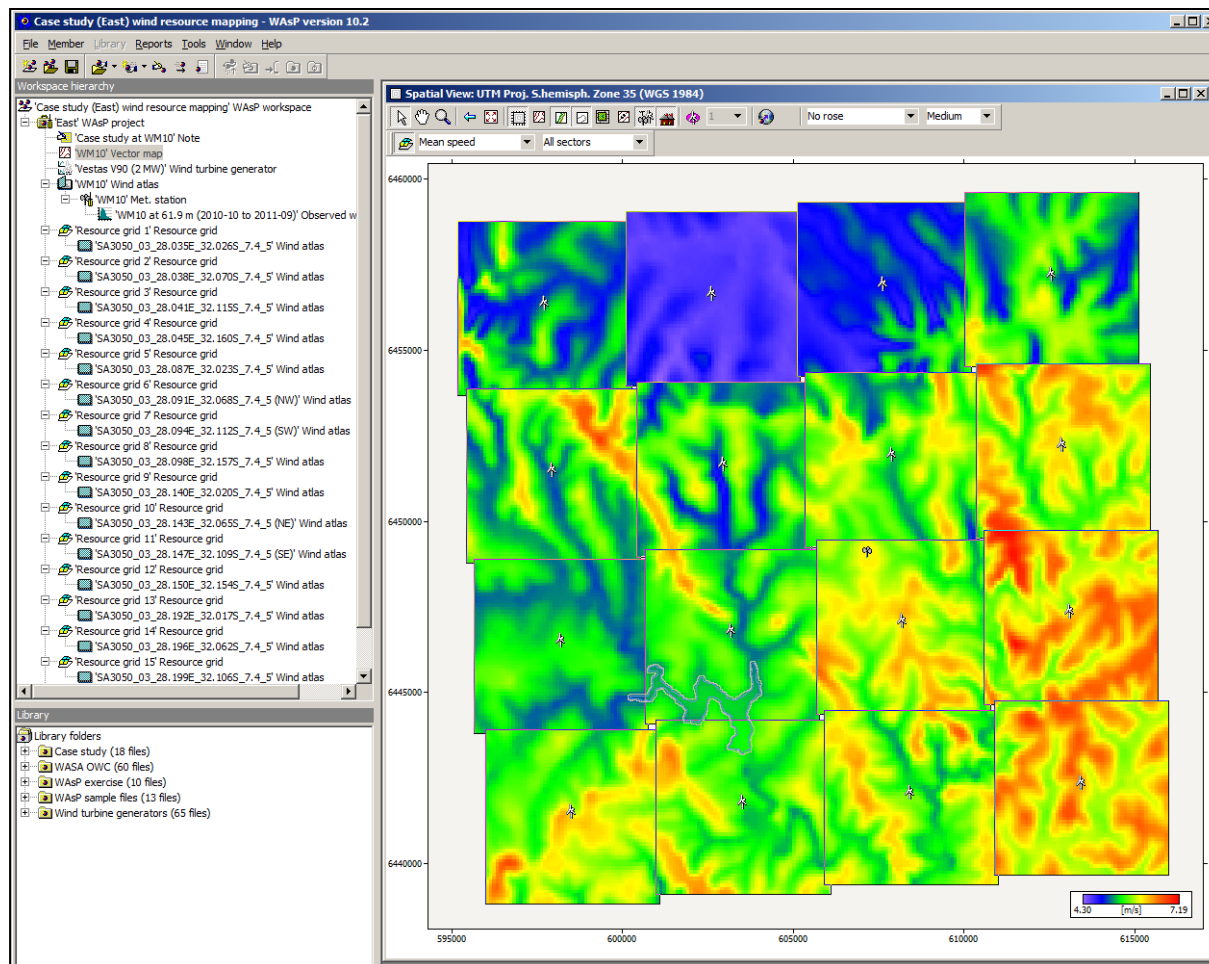
### Sample wind farm project in Google Earth





# Case study 2

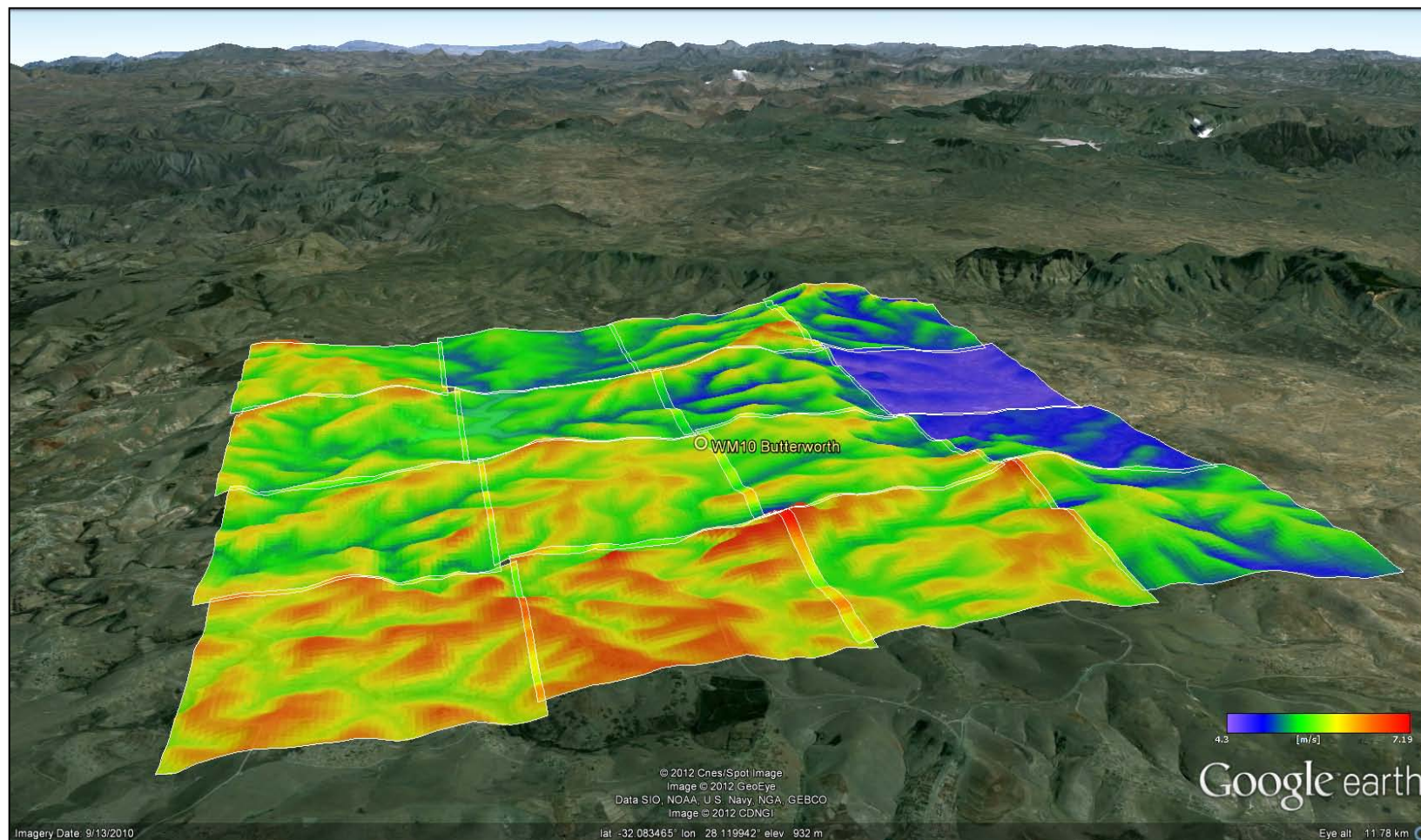
## Resource mapping using the numerical wind atlas





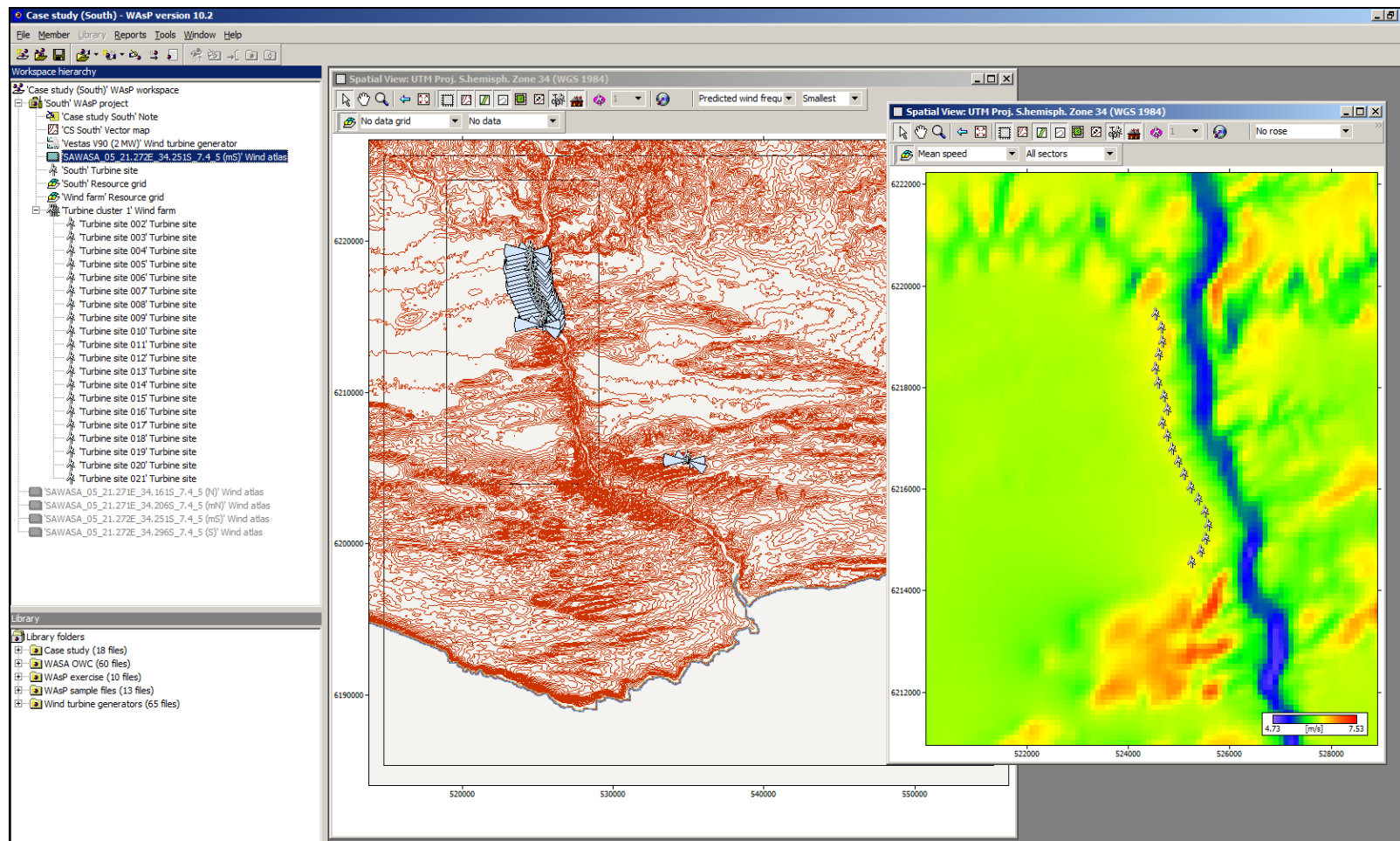
## Case study 2

# Resource mapping using the numerical wind atlas



# Case study 3

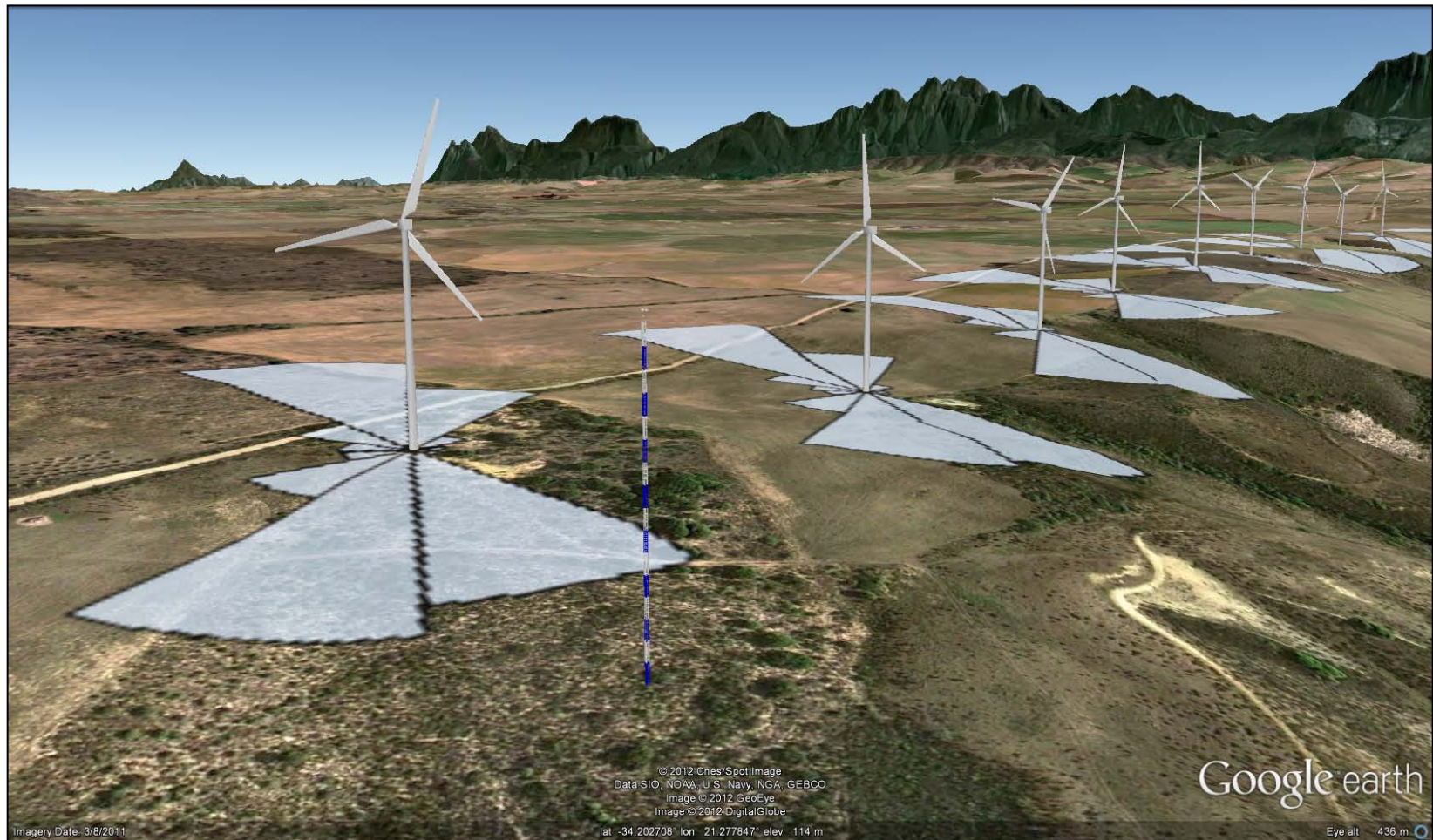
## Designing a new project, including met. mast





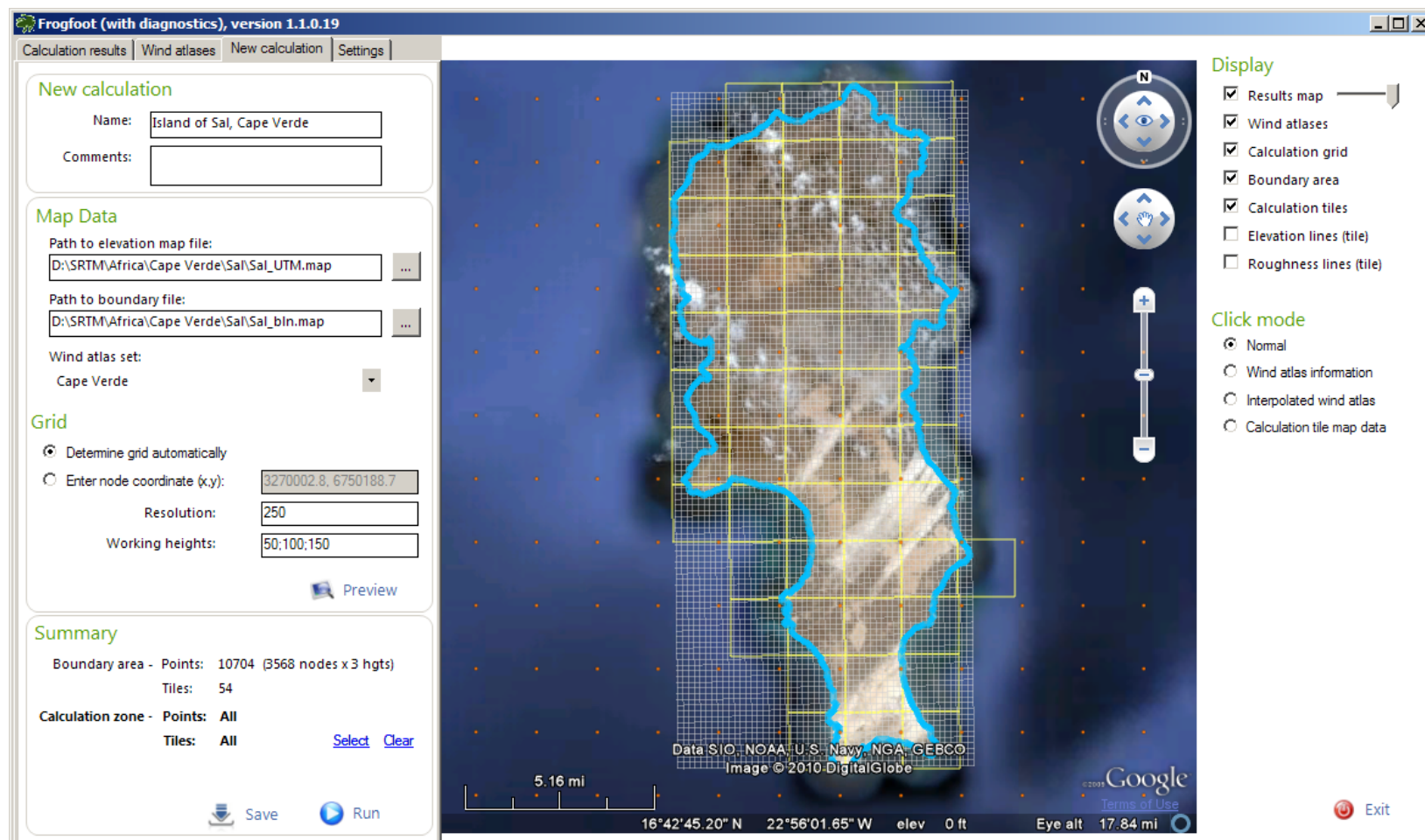
## Case study 3

### Designing a new project, including met. mast



# Phase II

## Microscale modelling over large areas



**Frogfoot (with diagnostics), version 1.1.0.19**

Calculation results | Wind atlases | New calculation | Settings

**New calculation**

Name:

Comments:

**Map Data**

Path to elevation map file:  ...

Path to boundary file:  ...

Wind atlas set:

**Grid**

☒ Determine grid automatically

☐ Enter node coordinate (x,y):

Resolution:

Working heights:

[Preview](#)

**Summary**

Boundary area - Points: 10704 (3568 nodes x 3 hghts)  
Tiles: 54

Calculation zone - Points: All  
Tiles: All [Select](#) [Clear](#)

[Save](#) [Run](#)

**Display**

- ☒ Results map
- ☒ Wind atlases
- ☒ Calculation grid
- ☒ Boundary area
- ☒ Calculation tiles
- ☐ Elevation lines (tile)
- ☐ Roughness lines (tile)

**Click mode**

- ☒ Normal
- ☐ Wind atlas information
- ☐ Interpolated wind atlas
- ☐ Calculation tile map data

Data S/O: NOAA, U.S. Navy, NGA, GEBCO  
Image © 2010 DigitalGlobe

5.16 mi

16°42'45.20" N 22°56'01.65" W elev 0 ft Eye alt 17.84 mi

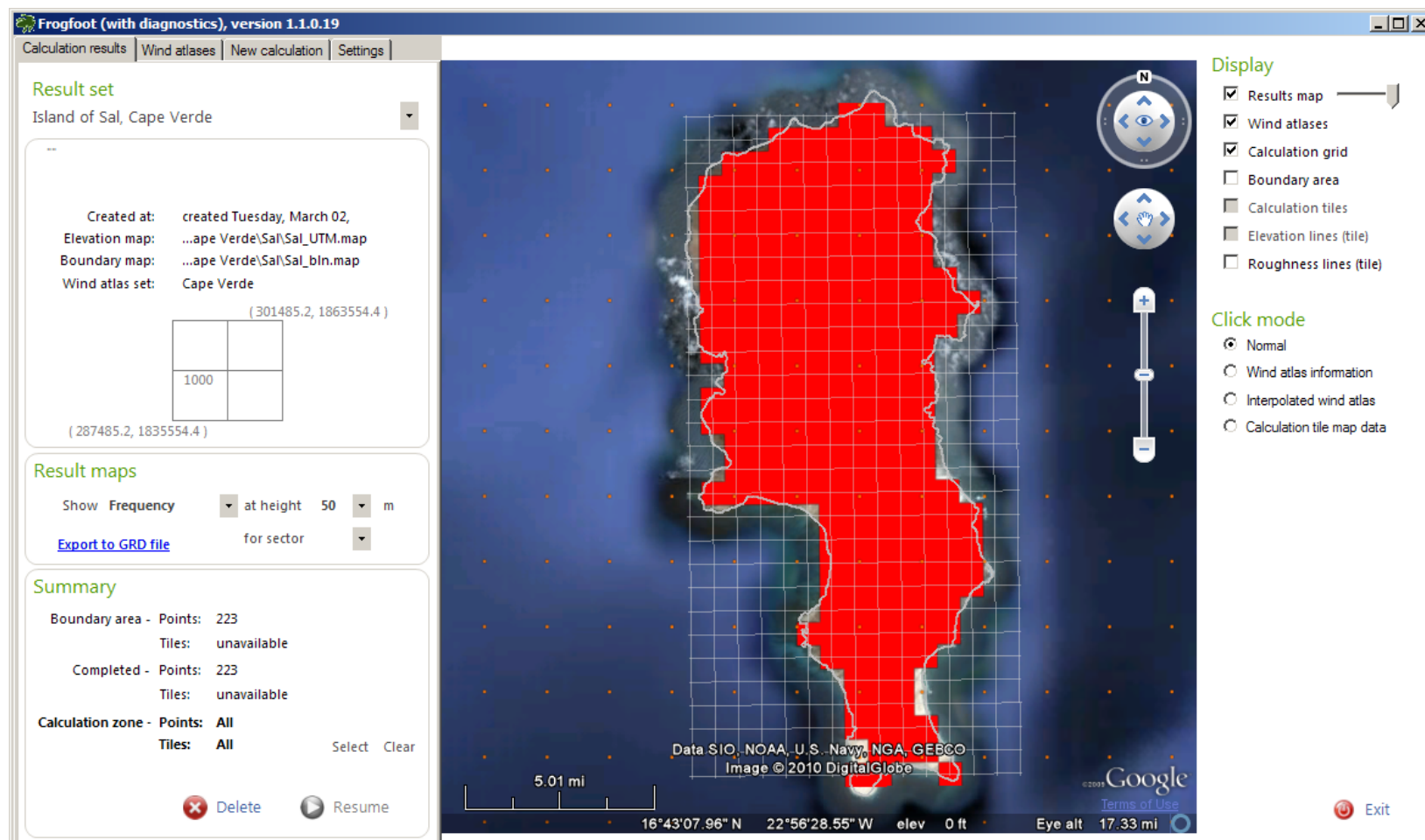
Google  
Terms of Use

[Exit](#)



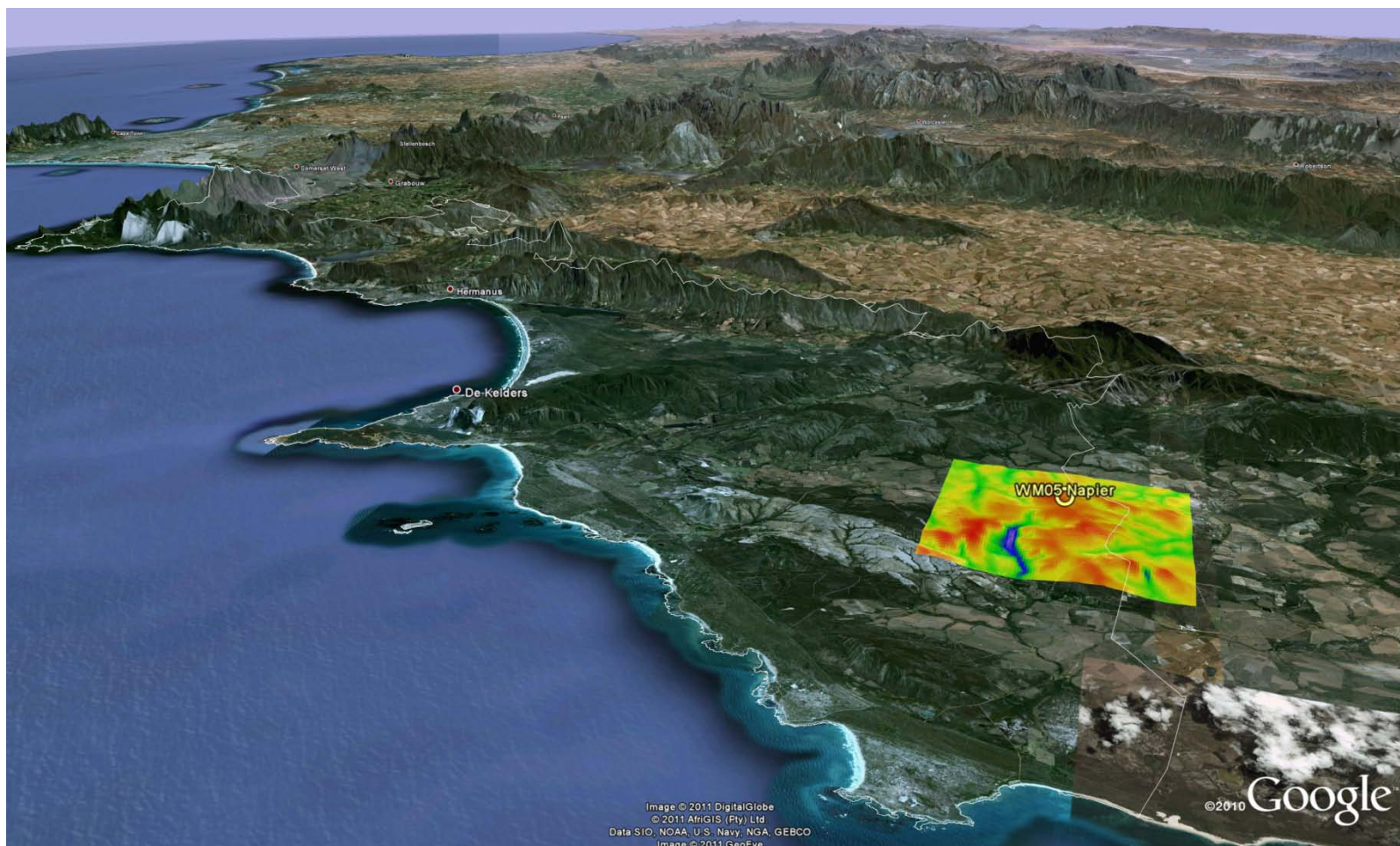
# Phase II

## Automated setup and modelling (Frogfoot)

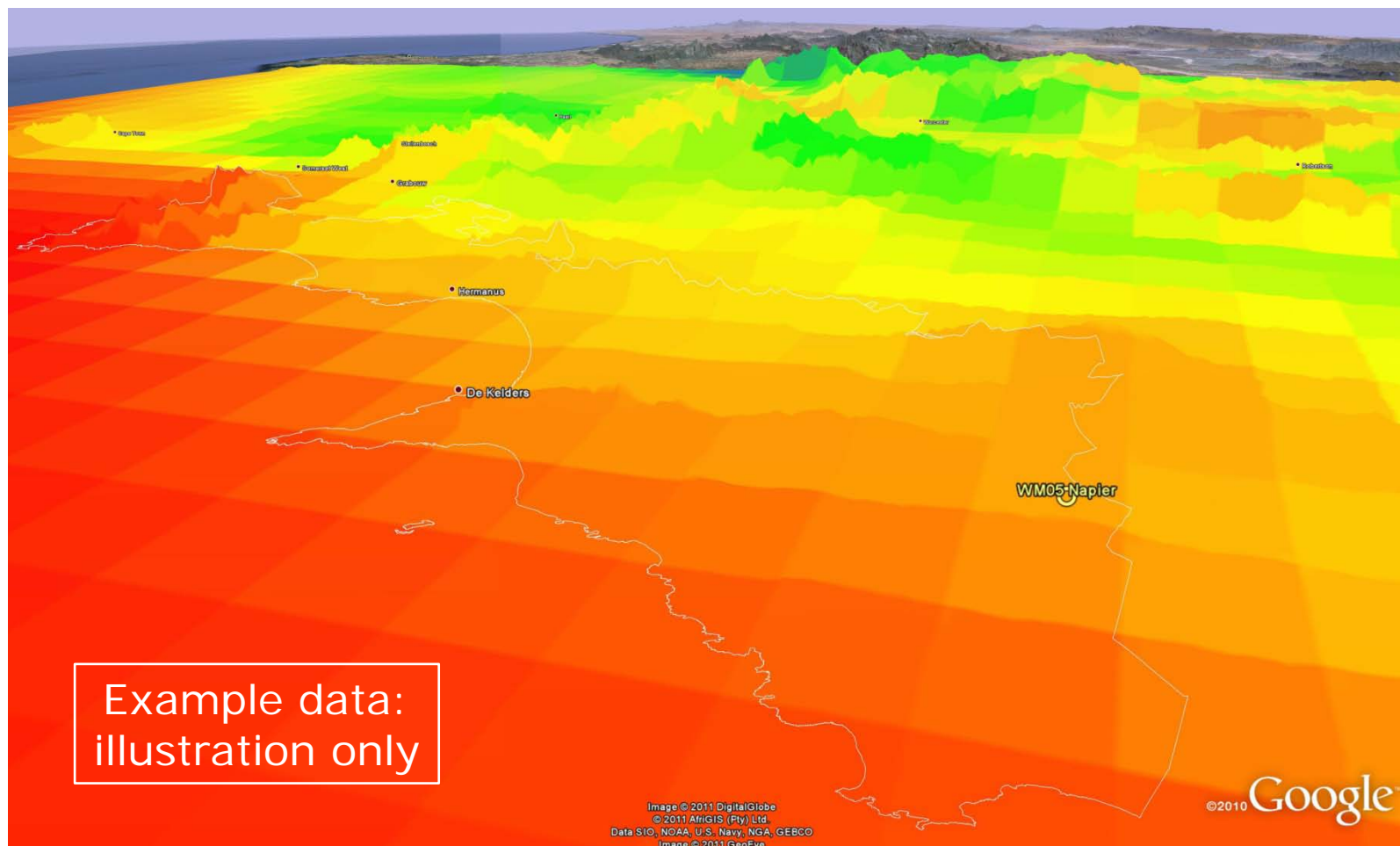


# Overstrand example

## Microscale modelling results @ WM05

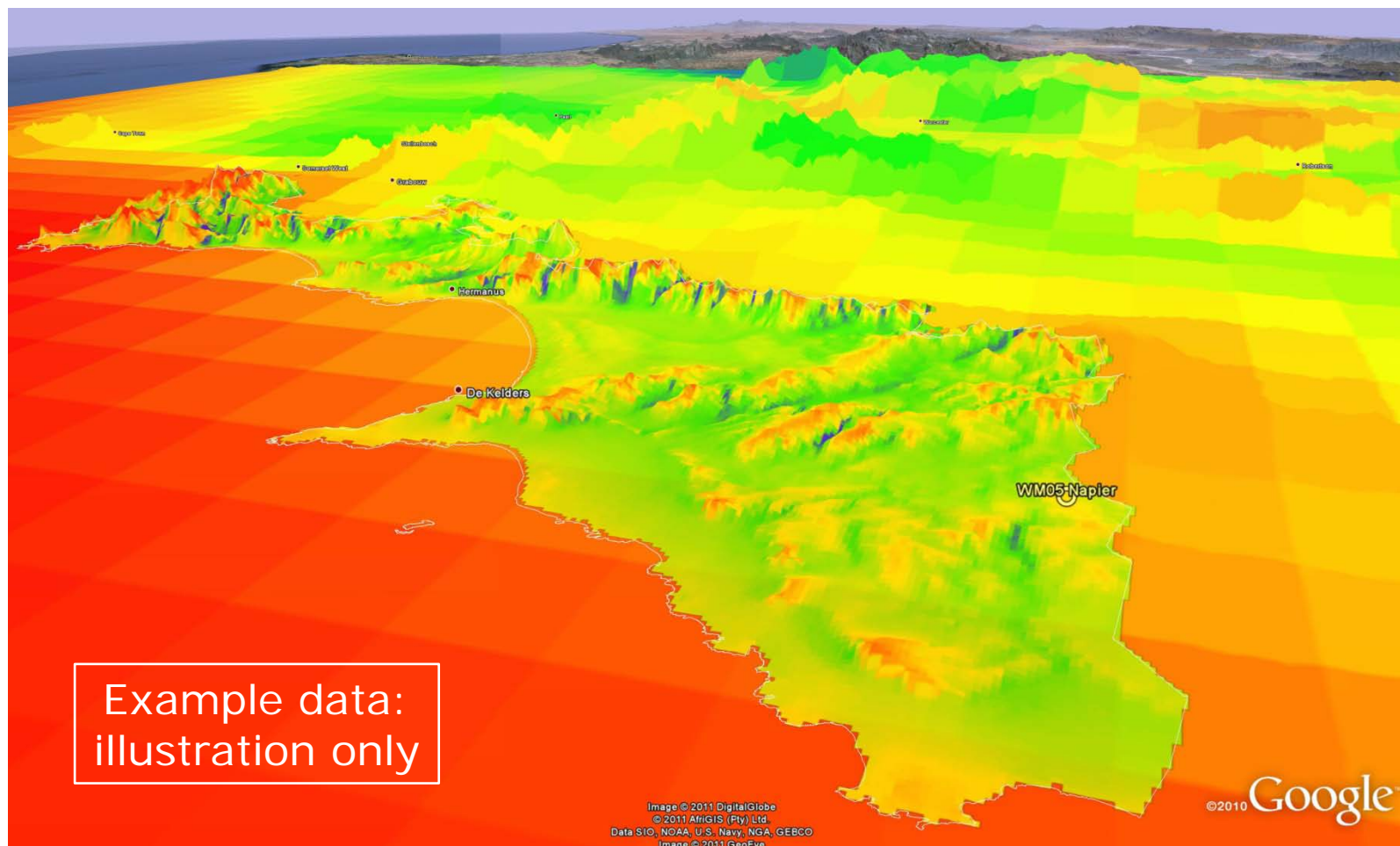


## Overstrand example Mesoscale modelling results in $5 \times 5 \text{ km}^2$ grid





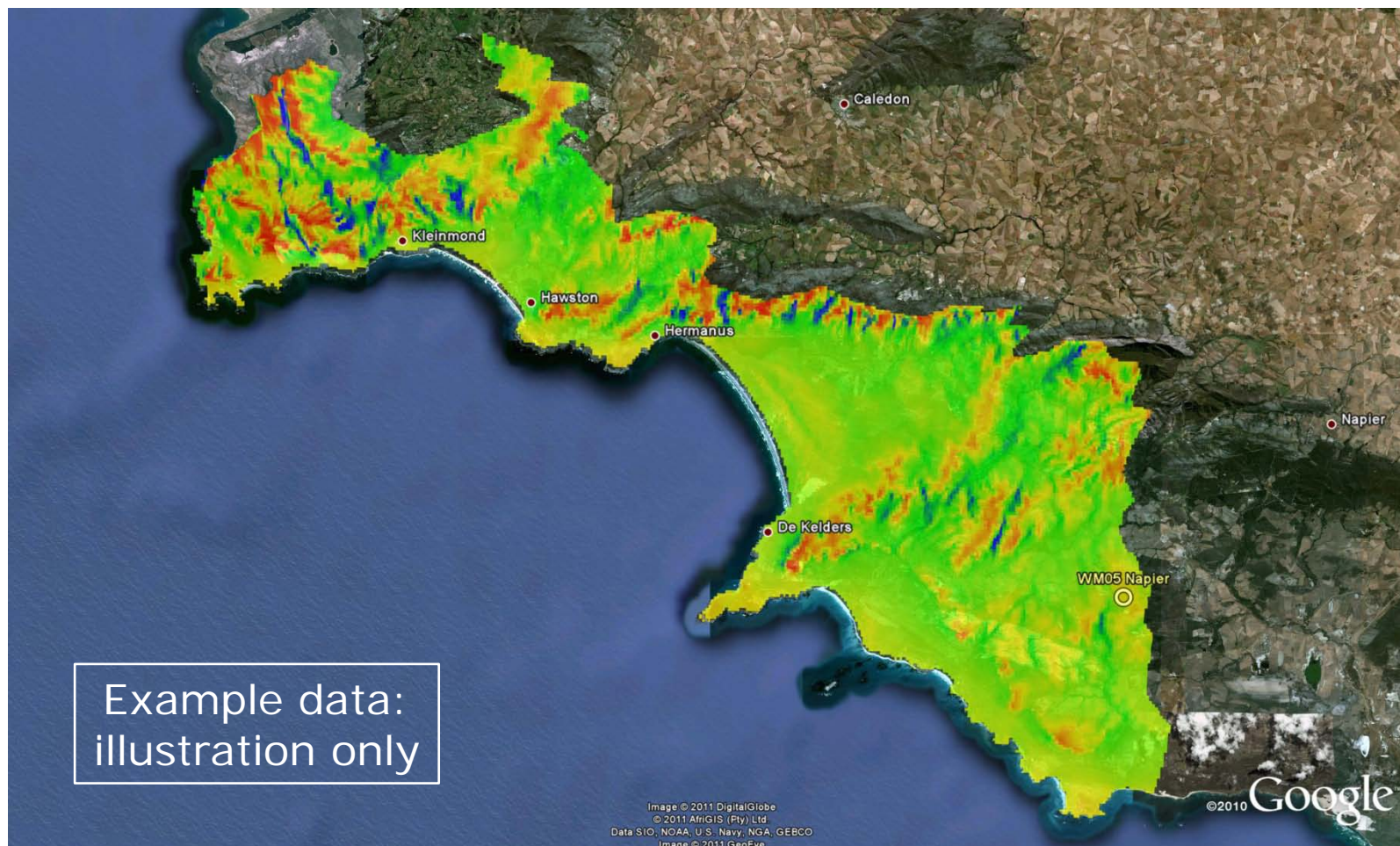
## Overstrand example Meso- and microscale results





## Overstrand example

### Wind resource mapping in Phase II



## User feedback is important!

- All data, model results and descriptions are available in public domain!
- WASA numerical wind atlas can provide a first estimate of the wind resource anywhere in the WASA study area.
- If and when you apply the numerical wind atlas (or the mast data), we would like to learn about your experiences.
- One way of providing feed back is to fill out the WASA Questionnaire:
  - [Questionnaire](#)